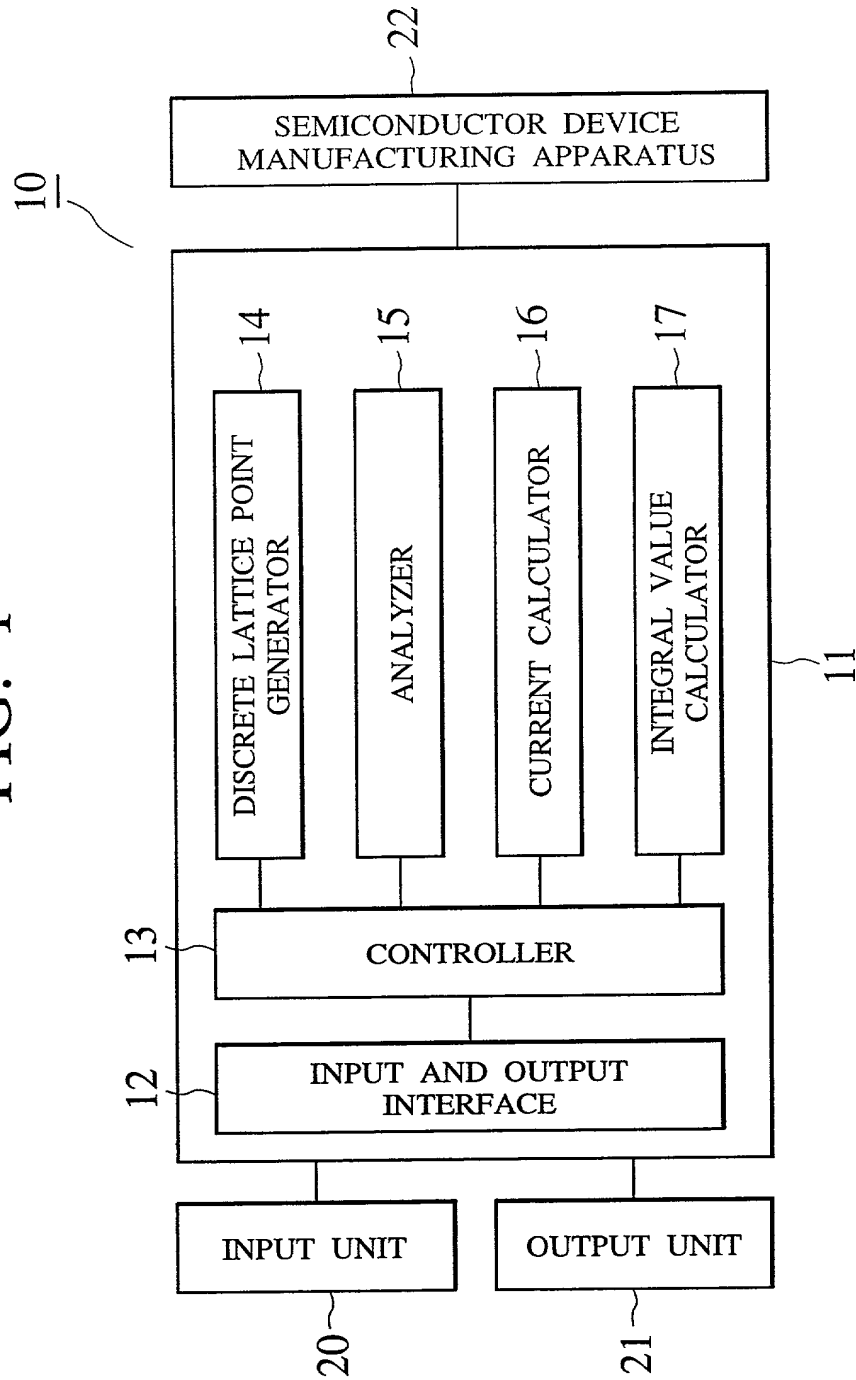


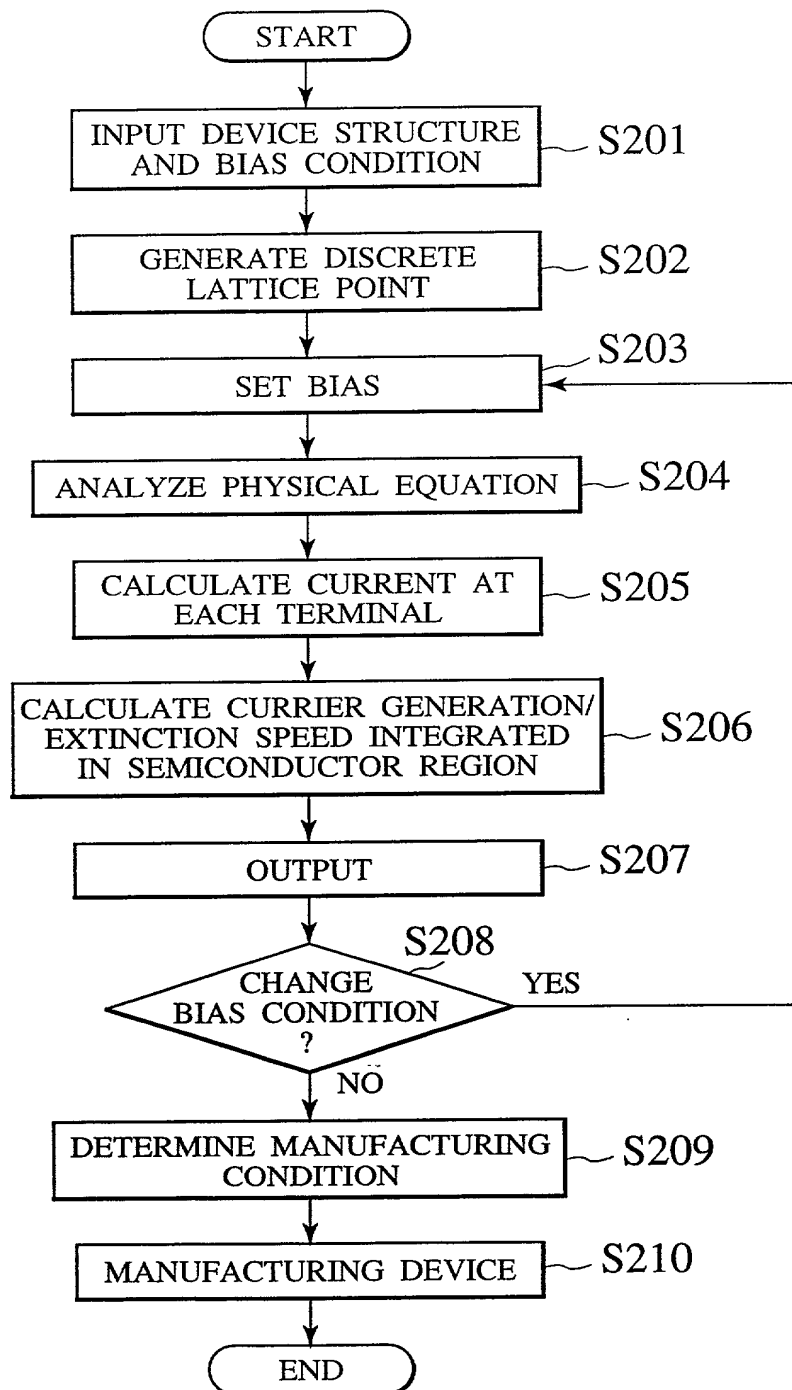
1/7

FIG. 1



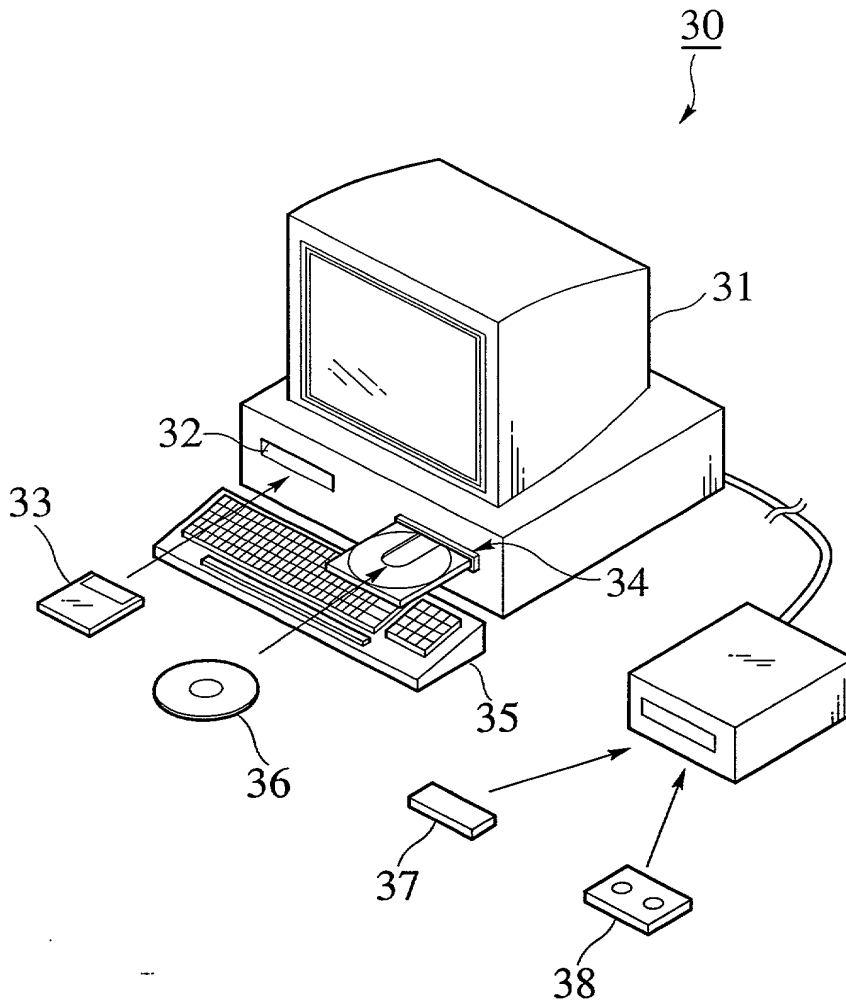
2/7

FIG. 2



3/7

FIG. 3



4/7

FIG. 4

(DEVICE STRUCTURE)

IMPURITY CONCENTRATION OF P-TYPE SUBSTRATE	$3 \times 10^{17} \text{cm}^{-3}$
GATE OXIDE FILM THICKNESS	6nm
GATE ELECTRODE	N-TYPE POLYSILICON
GATE LENGTH	$0.3 \mu\text{m}$
SOURCE/DRAIN DIFFUSION LAYER MAXIMUM CONCENTRATION	$1 \times 10^{20} \text{cm}^{-3}$
SOURCE/DRAIN DIFFUSION LAYER JUNCTION DEPTH	$0.08 \mu\text{m}$
DEVICE WIDTH	$1 \mu\text{m}$

5/7

FIG. 5A

	NO GR	SRH ONLY	II ONLY	BBT ONLY	ALL
SOURCE CURRENT	4.08E-17	1.38E-17	1.37E-17	4.17E-19	1.29E-18
DRAIN CURRENT	4.07E-17	6.78E-17	6.72E-17	9.45E-14	9.63E-14
SUBSTRATE CURRENT	3.37E-18	9.41E-18	1.72E-18	9.45E-14	9.62E-14

FIG. 5B

SOURCE CURRENT	1.29E-18
DRAIN CURRENT	9.63E-14
SUBSTRATE CURRENT	9.62E-14

MECHANISM	VOLUME INTEGRAL VALUE X PRIME CHARGE
J_{SRHn}	1.50E-17
J_{IIn}	1.68E-15
J_{BBTn}	9.45E-14

6/7

FIG. 6A

	NO GR	SRH ONLY	II ONLY	BBT ONLY	ALL
SOURCE CURRENT	4.08E-04	4.48E-04	4.48E-04	4.48E-04	4.48E-04
DRAIN CURRENT	4.08E-04	4.48E-04	4.48E-04	4.48E-04	4.48E-04
SUBSTRATE CURRENT	4.66E-18	1.59E-17	4.33E-08	4.66E-18	4.33E-08

FIG. 6B

SOURCE CURRENT	4.48E-04
DRAIN CURRENT	4.48E-04
SUBSTRATE CURRENT	4.33E-08

MECHANISM	VOLUME INTEGRAL VALUE X PRIME CHARGE
J_{SRHn}	4.78E-14
$J_{II n}$	4.33E-08
J_{BBTn}	0.00E+00

7/7

FIG. 7A
$$\frac{\delta n}{\delta t} = \frac{1}{q} \vec{\nabla} \cdot \vec{J}_n + GR_n$$

FIG. 7B
$$GR_n = GR_{SRHn} + GR_{IIn} + GR_{BBTn}$$

FIG. 7C
$$A_{SRHn} = \int_{Si} GR_{SRHn} dv$$

FIG. 7D
$$A_{IIn} = \int_{Si} GR_{IIn} dv$$

FIG. 7E
$$A_{BBTn} = \int_{Si} GR_{BBTn} dv$$

FIG. 7F
$$J_{SRHn} = q \int_{Si} GR_{SRHn} dv$$

FIG. 7G
$$J_{IIn} = q \int_{Si} GR_{IIn} dv$$

FIG. 7H
$$J_{BBTn} = q \int_{Si} GR_{BBTn} dv$$